Bellwork: 11/3/11

① $\frac{1}{3}x - 4 = \frac{3}{4}x + 9$ (×12)

$4x - 48 = 9x + 108$

$+48 \quad +48$

$4x = 9x + 156$

$-9x \quad -9x$

$-5x = 156$

$\frac{-5x}{-5} = \frac{156}{-5}$

$x = -\frac{156}{5}$

$f(x) = 2x + 2$

$g(x) = 3x - 4$

② $(f \cdot g)(x) =$

$(2x+2)(3x-4)$

$6x^2 - 8x + 6x - 8$

$6x^2 - 2x - 8$

$$f(x) = 2x + 5$$

① $y = 2x + 5$

② $x = 2y + 5$

③ $\frac{1}{2}x - \frac{5}{2} = \frac{2y}{2}$

$\frac{1}{2}x - \frac{5}{2} = y$

④ $f^{-1}(x) = \frac{1}{2}x - \frac{5}{2}$

$f(x) = 2x$

① $y = 2x$

② $\frac{1x}{2} = \frac{2y}{2}$

③ $\frac{1}{2}x = y$

④ $f^{-1}(x) = \frac{1}{2}x$

$$f(x) = 1 - x^3$$

① $y = 1 - x^3$

② $x = 1 - y^3$

③ $x - 1 = -y^3$

$-1 \quad -1 \qquad = -1$

$\sqrt[3]{-x+1} = \sqrt[3]{y^3}$

$\sqrt[3]{-x+1} = y$

④ $f^{-1}(x) = \sqrt[3]{-x+1}$

$f(x) = \frac{2}{5}x - 5$

① $y = \frac{2}{5}x - 5$

② $x = \frac{2}{5}y - 5$

③ $5(x + 5) = \left(\frac{2}{5}y\right)5$

$\frac{5x}{2} + \frac{25}{2} = \frac{2y}{2}$

$\frac{5x}{2} + \frac{25}{2} = y$

$f^{-1}(x) = \frac{5x}{2} + \frac{25}{2}$

Verifying That Functions are Inverses

Two functions are inverses if:

$f \circ f^{-1}(x) = x$ **and** $f^{-1} \circ f(x) = x$

Determine whether the following functions are inverses using composition.

4.) $f(x) = 4x + 1$ $\quad g(x) = \frac{x-1}{4}$

yes inverses of each other.

$f(g(x))$

$f\left(\frac{x-1}{4}\right)$

$4\left(\frac{x-1}{4}\right)+1$

$x-1+1$

x

$g(f(x))$

$g(4x+1)$

$\frac{(4x+1)-1}{4} = \frac{4x}{4} = x$

Verifying That Functions are Inverses

Two functions are inverses if:

$f \circ f^{-1}(x) = x$ **and** $f^{-1} \circ f(x) = x$

5.) $f(x) = x - 3$ $g(x) = -x + 3$

$f(g(x))$

$f(-x+3)$

$(-x+3)-3$

$-x$

$g(f(x))$

Not an inverse

$f(x) = 3x - 9$ $g(x) = -3x + 9$

$f(g(x))$ $g(f(x))$

2.4 - handout

9, 11, 12